DAFTAR PUSTAKA

1. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. The Lancet 2020;395:497–506.
2. Wang L, Wang Y, Ye D, Liu Q. Review of the 2019 novel coronavirus (SARS-CoV-2) based on current evidence. International Journal of Antimicrobial Agents 2020;55.
3. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. The Lancet 2020;395:507–13.
4. Bassatne A, Basbous M, Chakhtoura M, el Zein O, Rahme M, El-Hajj Fuleihan G. The link between COVID-19 and VItamin D (VIVID): A systematic review and meta-analysis. Metabolism: Clinical and Experimental 2021;119.
5. Hosseini B, El Abd A, Ducharme FM. Effects of Vitamin D Supplementation on COVID-19 Related Outcomes: A Systematic Review and Meta-Analysis. Nutrients. 2022 May 20;14(10):2134
6. Varikasuvu SR et al. COVID-19 and vitamin D (Co-VIVID study): a systematic review and meta-analysis of randomized controlled trials. Expert Rev Anti Infect Ther. 2022 Jun;20(6):907-913
7. Kazemi A et al. Association of Vitamin D Status with SARS-CoV-2 Infection or COVID-19 Severity: A Systematic Review and Meta-analysis. Adv Nutr. 2021 Oct 1;12(5):1636-1658.
8. Wang Z et al. Association of vitamin D deficiency with COVID-19 infection severity: Systematic review and meta-analysis. Clin Endocrinol (Oxf). 2022 Mar;96(3):281-287
9. Mishra P, Parveen R, Bajpai R, Agarwal N. Vitamin D Deficiency and Comorbidities as Risk Factors of COVID-19 Infection: A Systematic Review and Meta-analysis. J Prev Med Public Health. 2022 Jul;55(4):321-333.
10. Infante M, Ricordi C, Sanchez J, Clare-Salzler MJ, Padilla N, Fuenmayor V, et al. Influence of Vitamin D on Islet Autoimmunity and Beta-Cell Function in Type 1 Diabetes. Nutrients 2019;11:2185.

11. Bouillon R, Marcocci C, Carmeliet G, Bikle D, White JH, Dawson-Hughes B, et al. Skeletal and Extraskeletal Actions of Vitamin D: Current Evidence and Outstanding Questions. Endocrine Reviews 2019;40:1109–51.
12. Ali N. Role of vitamin D in preventing of COVID-19 infection, progression and severity. Journal of Infection and Public Health 2020;13:1373–80.
13. Martens PJ, Gysemans C, Verstuyf A, Mathieu AC. Vitamin D's Effect on Immune Function. Nutrients. 2020 Apr 28;12(5):1248.
14. Pereira M et al. Vitamin D deficiency aggravates COVID-19: systematic review and meta-analysis. Crit Rev Food Sci Nutr. 2020;1– 9.
15. Raharusun, P., Priambada, S., Budiarti, C., Agung, E., & Budi, C. Patterns of COVID-19 Mortality and Vitamin D: An Indonesian Study. *SSRN Electronic Journal*. 2020
16. Handoko, H., Purwanti, A., Tanjungsari, D. W., Pertiwi, I., & Murtiani, F. (2022). Hubungan Antara Kadar Vitamin D dengan Derajat Keparahan COVID-19. *The Indonesian Journal of Infectious Diseases*, *8*(1), 1
17. Bhardwaj A et al.COVID-19: Immunology, Immunopathogenesis and Potential Therapies, International Reviews of Immunology. 2022. 41:2, 171-206
18. Ochani RK, Kumar Ochani R, Asad A, Yasmin F, Shaikh S, Khalid H, et al. COVID-19 pandemic: from origins to outcomes. A comprehensive review of viral pathogenesis, clinical manifestations, diagnostic evaluation, and management. vol. 20. 2021.
19. Yüce M, Filiztekin E, Özkaya KG. COVID-19 diagnosis —A review of current methods. Biosensors and Bioelectronics 2021;172.
20. Peng MY, Liu WC, Zheng JQ, Lu CL, Hou YC, Zheng CM, Song JY, Lu KC, Chao YC. Immunological Aspects of SARS-CoV-2 Infection and the Putative Beneficial Role of Vitamin-D. Int J Mol Sci. 2021 May 16;22(10):5251.
21. Rokni M, Ghasemi V, Tavakoli Z. Immune responses and pathogenesis of SARS-CoV-2 during an outbreak in Iran: Comparison with SARS and MERS. Reviews in Medical Virology 2020;30.
22. Shimizu Y. Understanding the immunopathogenesis of COVID-19: Its implication for therapeutic strategy. World Journal of Clinical Cases 2020;8:5835–43.

23. Primorac, D. et al. Adaptive Immune Responses and Immunity to SARS-CoV-2. Front. Immunol. 2022;13:848582.
24. Widyastuti W, Dharmajati A, Siswanto. Imunosenesens dan Kerentanan Populasi Usia Lanjut Terhadap *Coronavirus Disease 2019* (Covid-19). *J Respir Indo Vol. 40 No. 3 Juli*. 2020 ; 182-19.
25. Indonesia MKR. KEPUTUSAN MENTERI KESEHATAN REPUBLIK INDONESIA NOMOR HK.01.07/MENKES/243/2022 TENTANG MANAJEMEN KLINIS TATA LAKSANA CORONA VIRUS DISEASE 2019 (COVID-19) DI FASILITAS PELAYANAN KESEHATAN. In: Indonesia KKR, editor. Jakarta: Kementerian Kesehatan Republik Indonesia; 2022. p. 1-100.
26. 24.Erlina Burhan ADS, Sally Aman Nasution, et all. PEDOMAN TATALAKSANA COVID-19 EDISI 4. 4 ed. Jakarta: Perhimpunan Dokter Paru Indonesia (PDPI), Perhimpunan Dokter Spesialis Kardiovaskular Indonesia (PERKI), Perhimpunan Dokter Spesialis Penyakit Dalam Indonesia (PAPDI), Perhimpunan Dokter Anestesiologi dan Terapi Intensif Indonesia (PERDATIN), Ikatan Dokter Anak Indonesia (IDAI); 2022. 165 p.
27. Zhang JJ, Dong X, Liu GH, Gao YD. Risk and Protective Factors for COVID-19 Morbidity, Severity, and Mortality. Clin Rev Allergy Immunol. 2022 Jan 19:1–18
28. Wolff D, Nee S, Hickey NS, Marschollek M. Risk factors for Covid-19 severity and fatality: a structured literature review. Infection. 2021 Feb;49(1):15-28
29. Rashedi J, Mahdavi Poor B, Asgharzadeh V, Pourostadi M, Samadi Kafil H, Vegari A, Tayebi-Khosroshahi H, Asgharzadeh M. Risk Factors for COVID-19. Infez Med. 2020 Dec 1;28(4):469-474
30. Li J, Huang DQ, Zou B et al (2021) Epidemiology of COVID-19: a systematic review and meta-analysis of clinical characteristics, risk factors, and outcomes. J Med Virol 93:1449–1458
31. Li X, Zhong X, Wang Y, Zeng X, Luo T, Liu Q (2021) Clinical determinants of the severity of COVID-19: A systematic review and meta-analysis. PLoS ONE 16(5): e0250602
32. Jeon SM, Shin EA. Exploring vitamin D metabolism and function in cancer. Experimental and Molecular Medicine 2018;50.

33. Saponaro F, Saba A, Zucchi R. An update on vitamin d metabolism. International Journal of Molecular Sciences 2020;21:1–19.
34. Amrein K et al. Vitamin D deficiency 2.0: an update on the current status worldwide. European Journal of Clinical Nutrition (2020) 74:1498–1513
35. Chutterpaul P, Paruk F, Cassim B. Prevalence of vitamin D deficiency in older South Africans with and without hip fractures and the effects of age, body weight, ethnicity and functional status. Journal of Endocrinology, Metabolism and Diabetes of South Africa 2018; 0(0):1–6
36. Holick MF et al. Evaluation, treatment, and prevention of vitamin D deficiency: an Endocrine Society clinical prac7ce guideline. J Clin Endocrinol Metab 2011; 96:1911-30
37. Charoenngam N, Holick MF. Immunologic effects of vitamin d on human health and disease. Nutrients 2020;12:1–28.
38. Ao T, Kikuta J, Ishii M. The effects of vitamin D on immune system and inflammatory diseases. Biomolecules 2021;11.
39. Mao X, Hu B, Zhou Z, Xing X, Wu Y, Gao J, et al. Vitamin D levels correlate with lymphocyte subsets in elderly patients with age-related diseases. Scientific Reports 2018;8.
40. Sarkar S, Hewison M, Studzinski GP, Li YC, Kalia V. Role of Vitamin D in cytotoxic T lymphocyte immunity to pathogens and cancer. Critical Reviews in Clinical Laboratory Sciences 2016;53:132–45.
41. Mohan M, Cherian JJ, Sharma A. Exploring links between Vitamin D deficiency and covid-19. PLoS Pathogens 2020;16.
42. Herr C, Greulich T, Koczulla RA, Meyer S, Zakharkina T, Branscheidt M, Eschmann R, Bals R. The role of vitamin D in pulmonary disease: COPD, asthma, infection, and cancer. Respir Res. 2011 Mar 18;12(1):31.
43. Mercola J, Grant WB, Wagner CL. Evidence regarding vitamin d and risk of covid-19 and its severity. Nutrients 2020;12:1–24
44. Basaran N, Adas M, Gokden Y, Turgut N, Yildirmak T, Guntas G. The relationship between vitamin D and the severity of COVID-19. Bratislava Medical Journal 2021;122:200–5.
45. Daneshkhah A, Agrawal V, Eshein A, Subramanian H, Roy HK, Backman V. Evidence for possible association of vitamin D status with cytokine storm and

unregulated inflammation in COVID-19 patients. Aging Clinical and Experimental Research 2020;32:2141–58.

46. Maha Q, Talal M. Can Vitamin D Deficiency Increase the Susceptibility to COVID-19? Frontiers in Physiology 2021;12.
47. Lau FH, Majumder R, Torabi R, Saeg F, Hoffman R, Cirillo JD, et al. Vitamin D insufficiency is prevalent in severe COVID-19. MedRxiv 2020:1–6.
48. M. Monod et al. Age groups that sustain resurging COVID-19 epidemics in the United States.Science 371, eabe8372 (2021)
49. Pijls BG, Jolani S, Atherley A et al (2021) Demographic risk factors for COVID-19 infection, severity, ICU admission and death: a meta-analysis of 59 studies. BMJ, (Open) 11:e044640.
50. Brodin, P. Immune determinants of COVID-19 disease presentation and severity. *Nat Med***27**, 28–33 (2021)
51. Team TNCPERE (2020) The epidemiological characteristics of an out- break of 2019 novel coronavirus disease (COVID-19). China CDC Weekly 2:113–122
52. Gebhard C, Regitz-Zagrosek V, Neuhauser HK, Morgan R, Klein SL (2020) Impact of sex and gender on COVID-19 outcomes in Europe. Biol Sex Differ 11:29
53. Hoffmann M, Kleine-Weber H, Schroeder S, Kruger N, Herrler T, Erichsen S, Schiergens TS, Herrler G, Wu NH, Nitsche A, Muller MA, Drosten C, Pohlmann S (2020) SARS-CoV-2 cell entry de- pends on ACE2 and TMPRSS2 and Is blocked by a clinically prov- en protease inhibitor. Cell 181:271-280 e278
54. Gheblawi M, Wang K, Viveiros A, Nguyen Q, Zhong JC, Turner AJ, Raizada MK, Grant MB, Oudit GY (2020) Angiotensin-Converting Enzyme 2: SARS-CoV-2 Receptor and Regulator of the Renin- Angiotensin System: Celebrating the 20th Anniversary of the Discovery of ACE2. Circ Res 126:1456–1474
55. Jain U (2020) Effect of COVID-19 on the organs. Cureus 12:e9540
56. Pinto BGG, Oliveira AER, Singh Y, Jimenez L, Goncalves ANA, Ogava RLT, Creighton R, Schatzmann Peron JP, Nakaya HI (2020) ACE2 expression is

increased in the lungs of patients with comorbidities associated with severe COVID-19. J Infect Dis 222:556–563

57. Cai G, Bosse Y, Xiao F, Kheradmand F, Amos CI (2020) Tobacco smoking increases the lung gene expression of ACE2, the receptor of SARS-CoV-2. Am J Respir Crit Care Med 201:1557–1559
58. Yang, J., Ma, Z., & Lei, Y. (2021). A meta-analysis of the association between obesity and COVID-19. *Epidemiology & Infection, 149*, E11
59. Min Gao et al. Associations between body-mass index and COVID-19 severity in 6·9 million people in England: a prospective, community-based, cohort study. The Lancet Diabetes & Endocrinology,Volume 9, Issue 6. 2021,Pages 350-359.
60. Chu, Y., Yang, J., Shi, J. *et al.* Obesity is associated with increased severity of disease in COVID-19 pneumonia: a systematic review and meta-analysis. *Eur J Med Res* **25**, 64 (2020).
61. Aghili SMM, Ebrahimpur M, Arjmand B, Shadman Z, Pejman Sani M, Qorbani M, Larijani B, Payab M. Obesity in COVID-19 era, implications for mechanisms, comorbidities, and prognosis: a review and meta-analysis. Int J Obes (Lond). 2021 May;45(5):998-1016.
62. Kang IS, Kong KA. Body mass index and severity/fatality from coronavirus disease 2019: A nationwide epidemiological study in Korea. PloS one. 2021 Jun 22;16(6):e0253640.
63. Guan WJ, Liang WH, Zhao Y, Liang HR, Chen ZS, Li YM, Liu XQ, Chen RC, Tang CL, Wang T, Ou CQ. Comorbidity and its impact on 1590 patients with COVID-19 in China: a nationwide analysis. European Respiratory Journal. 2020 May 1;55(5).
64. Barek MA, Aziz MA, Islam MS. Impact of age, sex, comorbidities and clinical symptoms on the severity of COVID-19 cases: a meta-analysis with 55 studies and 10014 cases. Heliyon. 2020;6(12):e05684.
65. Pranata R, Lim MA, Huang I, Raharjo SB, Lukito AA. Hypertension is associated with increased mortality and severity of disease in COVID-19 pneumonia: a systematic review, meta-analysis and meta-regression. Journal of the renin-angiotensin-aldosterone system: JRAAS. 2020 Apr;21(2)

66. Muhamad SA, Ugusman A, Kumar J, Skiba D, Hamid AA, Aminuddin A. COVID-19 and hypertension: the what, the why, and the how. Frontiers in Physiology. 2021 May 3;12:665064.
67. Xia F., Zhang M., Cui B., An W., Chen M., Yang P., et al. COVID-19 patients with hypertention are at potential risk of worsened organ injury. Scientific Reports. Nature. 2021.11:3779.
68. Huang I, Lim MA, Pranata R. Diabetes mellitus is associated with increased mortality and severity of disease in COVID-19 pneumonia–a systematic review, meta-analysis, and meta-regression. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2020 Jul 1;14(4):395-403.
69. Mantovani A, Byrne CD, Zheng MH, Targher G. Diabetes as a risk factor for greater COVID-19 severity and in-hospital death: a meta-analysis of observational studies. Nutrition, Metabolism and Cardiovascular Diseases. 2020 Jul 24;30(8):1236-48.
70. Wang A, Zhao W, Xu Z, Gu J. Timely blood glucose management for the outbreak of 2019 novel coronavirus disease (COVID-19) is urgently needed. Diabetes Res Clin Pract 162: 108118, 2020.
71. LiuF,LongX,ZouW,FangM,WuW,LiW,ZhangB,ZhangW, Chen X, Zhang Z. Highly ACE2 expression in pancreas may cause pancreas damage after SARS-CoV-2 infection. Clin Gastroenterol Hepatol 18: 2128–2130.e2, 2020.
72. Iqbal A, Prince LR, Novodvorsky P, Bernjak A, Thomas MR, Birch L, Lambert D, Kay LJ, Wright FJ, Macdonald IA, Jacques RM, Storey RF, McCrimmon RJ, Francis S, Heller SR, Sabroe I. Effect of hypoglycemia on inflammatory responses and the response to low- dose endotoxemia in humans. J Clin Endocrinol Metab 104: 1187– 1199, 2019.
73. Brenner, Hermann, Bernd Holleczek, and Ben Schöttker. Vitamin D insufficiency and deficiency and mortality from respiratory diseases in a cohort of older adults: potential for limiting the death toll during and beyond the COVID-19 pandemic?. *Nutrients* 12.8 (2020): 2488.
74. Thacher, Tom D., and Bart L. Clarke. Vitamin D insufficiency. *Mayo Clinic Proceedings*. Vol. 86. No. 1. Elsevier, 2011.

75. Bordelon, Paula, Maria V. Ghetu, and Robert C. Langan. Recognition and management of vitamin D deficiency.*American family physician* 80.8 (2009): 841-846.
76. Jude, Edward B., et al. Vitamin D deficiency is associated with higher hospitalization risk from COVID-19: a retrospective case-control study.*The Journal of Clinical Endocrinology & Metabolism* 106.11 (2021): e4708-e4715.
77. Davoudi, Alireza, et al. "Lack of association between vitamin D insufficiency and clinical outcomes of patients with COVID-19 infection." *BMC Infectious Diseases* 21.1 (2021): 1-7.
78. *Teshome A, Adane A, Girma B and Mekonnen ZA (2021) The Impact of Vitamin D Level on COVID-19 Infection: Systematic Review and Meta-Analysis. Front. Public Health 9:624559.*
79. D'Ecclesiis O, Gavioli C, Martinoli C, Raimondi S, Chiocca S, Miccolo C, et al. (2022) Vitamin D and SARS-CoV2 infection, severity and mortality: A systematic review and meta-analysis. PLoS ONE 17(7): e0268396
80. Batkunde, Y. A. ., Ilyas, M. ., Djaharuddin, I. ., Tabri, N. A. ., Iskandar, H. ., & Santoso, A. . (2021). Analysis of Vitamin D Levels on Bronchiectasis Severity. *Respiratory Science*, *1*(2), 88-97.
81. Hidayat, Rudy, Siti Setiati, and Pradana Soewondo. "The association between vitamin D deficiency and type 2 diabetes mellitus in elderly patients." *Age* 42 (2010): 123-129.
82. Nimitphong H, Holick MF. Vitamin D status and sun exposure in southeast Asia. Dermatoendocrinol. 2013 Jan 1;5(1):34-7.
83. Tønnesen et al. Determinants of vitamin D status in young adults: influence of lifestyle, sociodemographic and anthropometric factors. BMC Public Health (2016) 16:385 .
84. Basaran N, Adas M, Gokden Y, Turgut N, Yildirmak T, Guntas G. The relationship between vitamin D and the severity of COVID-19. Bratislava Medical Journal 2021;122:200–5.
85. Orchard L, Baldry M, Nasim-Mohi M, Monck C, Saeed K, Grocott MPW, et al. Vitamin-D levels and intensive care unit outcomes of a cohort of critically ill COVID-19 patients. Clin Chem Lab Med. 2021 May 1;59(6):1155–63.

86. Han Seok Choi, Han Jin Oh, Hoon Choi, Woong Hwan Choi, Jung Gu Kim, Kyoung Min Kim, Kwang Joon Kim, Yumie Rhee, Sung-Kil Lim, Vitamin D Insufficiency in Korea—A Greater Threat to Younger Generation: The Korea National Health and Nutrition Examination Survey (KNHANES) 2008, *The Journal of Clinical Endocrinology & Metabolism*, Volume 96, Issue 3, 1 March 2011, Pages 643–651
87. Chailurkit, La-or, Wichai Aekplakorn, and Boonsong Ongphiphadhanakul. Regional variation and determinants of vitamin D status in sunshine-abundant Thailand. *BMC public health* 11.1 (2011): 1-7
88. Rolizola, dkk. Vitamin D insufficiency and factors associated: a study with older adults people from primary health care network. Ciênc. saúde coletiva 27 (02) • Feb 2022
89. Kim SH, Oh JE, Song DW, Cho CY, Hong SH, Cho YJ, Yoo BW, Shin KS, Joe H, Shin HS, Son DY. The factors associated with Vitamin D deficiency in community dwelling elderly in Korea. Nutr Res Pract. 2018 Oct;12(5):387-395.
90. Pereira-Santos, M., et al. Obesity and vitamin D deficiency: a systematic review and meta-analysis. *Obesity reviews* 16.4 (2015): 341-349.
91. Saneei, P., A. Salehi-Abargouei, and A. Esmaillzadeh. Serum 25-hydroxy vitamin D levels in relation to body mass index: a systematic review and meta-analysis. *Obesity Reviews* 14.5 (2013): 393-404.
92. Sundari, Luh Putu Ratna, and Luh Putu. Defisiensi vitamin D pada obesitas.*Sport Fit J* 6.1 (2018): 1-5.
93. ReisJP,vonMuhlenD,MillerERIII,MichosED,AppelLJ.VitaminD status and cardiometabolic risk factors in the United States adolescent popula- tion. *Pediatrics*. 2009;124(3):e371-e379.
94. Martins D, Wolf M, Pan D, et al. Prevalence of cardiovascular risk fac- tors and the serum levels of 25-hydroxyvitamin D in the United States: data from the Third National Health and Nutrition Examination Survey. *Arch Intern Med*. 2007;167(11):1159-1165.
95. Reis, A. F., O. M. Hauache, and G. Velho. Vitamin D endocrine system and the genetic susceptibility to diabetes, obesity and vascular disease. A review of evidence. *Diabetes & metabolism*31.4 (2005): 318-325.

96. Ebadi M, Montano-Loza AJ. Perspective: improving vitamin D status in the management of COVID-19. Eur J Clin Nutr. 2020 Jun 1;74(6):856–9.
97. Vanherwegen AS, Gysemans C, Mathieu C. Regulation of Immune Function by Vitamin D and Its Use in Diseases of Immunity. Endocrinol Metab Clin North Am. 2017 Dec 1;46(4):1061–94.
98. Laird E, McNulty H, Ward M, Hoey L, McSorley E, Wallace JMW, et al. Vitamin D deficiency is associated with inflammation in older Irish adults. J Clin Endocrinol Metab. 2014;99(5):1807–15.
99. Kong J, Zhu X, Shi Y, Liu T, Chen Y, Bhan I, et al. VDR attenuates acute lung injury by blocking Ang-2-Tie-2 pathway and renin-angiotensin system. Mol Endocrinol. 2013 Dec 1;27(12):2116–25.
100. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet (London, England). 2020 Mar 28;395(10229):1054–62.
101. Luo, Xia, et al. Vitamin D deficiency is associated with COVID-19 incidence and disease severity in Chinese people.*The Journal of nutrition* 151.1 (2021): 98-103.
102. Radujkovic, Aleksandar, et al. Vitamin D deficiency and outcome of COVID-19 patients. *Nutrients* 12.9 (2020): 2757
103. Oscanoa, Teodoro J., et al. "The relationship between the severity and mortality of SARS-CoV-2 infection and 25-hydroxyvitamin D concentration—a metaanalysis." *Advances in respiratory medicine* 89.2 (2021): 145-157
104. Bushnaq, Taqwa, et al. The impact of vitamin D status on COVID-19 severity among hospitalized patients in the western region of Saudi Arabia: a retrospective cross-sectional study. *International Journal of Environmental Research and Public Health* 19.3 (2022): 1901.
105. Thacher TD. Vitamin D and COVID-19. Mayo Clin Proc. 2021.

106. Kostoglou-Athanassiou I, Pantazi E, Kontogiannis S, Kousouris D, Mavropoulos I, Athanassiou P. Vitamin D in acutely ill patients. J Int Med Res. 2018;46(10): 4246–57.

107. Thurnham D. Plasma 25-hydroxy-cholecalciferol (Vitamin D) is depressed by inflammation: implications and parallels with other micronutrients. Sight and Life. 2011;25(2):38–47.

108. Reid D, Toole BJ, Knox S, Talwar D, Harten J, O'Reilly DSJ, et al. The relation between acute changes in the systemic inflammatory response and plasma 25- hydroxyvitamin D concentrations after elective knee arthroplasty. Am J Clin Nutr. 2011;93(5):1006–11.

109. Quraishi SA, Camargo Jr CA. Vitamin D in acute stress and critical illness. Curr Opin Clin Nutr Metab Care. 2012;15(6):625–34.

110. Dirks NF, Ackermans MT, Lips P, de Jongh RT, Vervloet MG, de Jonge R, et al. The when, what & how of measuring vitamin D metabolism in clinical medicine. Nutri- ents. 2018;10(4):482.

111. Holick MF. Vitamin D status: measurement, interpretation, and clinical application. Ann Epidemiol. 2009 Feb;19(2):73-8

112. Charoenngam, Nipith, et al. Genetic Variations of the Vitamin D Metabolic Pathway and COVID-19 Susceptibility and Severity: Current Understanding and Existing Evidence. *Biomedicines*11.2 (2023): 400.

113. Abdollahzadeh, Rasoul, et al. Association of Vitamin D receptor gene polymorphisms and clinical/severe outcomes of COVID-19 patients. *Infection, Genetics and Evolution* 96 (2021): 105098